

## **EJSG Work Plan**

### **A. Project Title and Project Purpose Statement**

Project Title- Climate Change Resiliency: Effects of Industrial Animal Production on ME (Mother Earth)

The purpose of this EJSG Project is to enlighten the public, including grassroots, mid-range and upper level stakeholders, on the correlation between industrial animal operations and climate change and how to protect themselves from these risks. In his book, *This Moment on Earth*, John Kerry writes about industrial progress and its contributions to climate change. He emphasizes that chemicals emitted from industries are contaminating the air we breathe, and, along with other methods of environmental pollution, contributing to climate change and planetary devastation, and Ron Cummins at [www.ecowatch.com](http://www.ecowatch.com) (January 21, 2013) supports a growing number of climate experts in their conclusions that “industrial food and farming systems are the major cause of man-made global warming.” He further states that “CAFOs play a key role in this impending disaster.”

Climate Change: Effects of Industrial Animal Production on ME (Mother Earth) will: 1.) Pull significant data/results from CHEIHO, Surface Water Sampling, CAFO Workers Exposure and other significant REACH research; 2.) Prepare a publication (pamphlet or booklet) illustrating significant findings and their connection to earth changes; 3.) Sponsor gatherings to educate grassroots populations on the correlation between industrial animal operations and; 4.) Implement discussions among partners on findings from past research on industrial animal production and the relationship of that research on climate change resiliency; and 5.) Make presentations to environmental and other public officials on findings from past research and connections to climate change. Applicable statutes are the Clean Air Act, Section 103(b) (3) and the Toxic Substance Control Act, section 10 (a).

### **B. Environmental, Public Health and community climate resiliency (if applicable) information about the affected community**

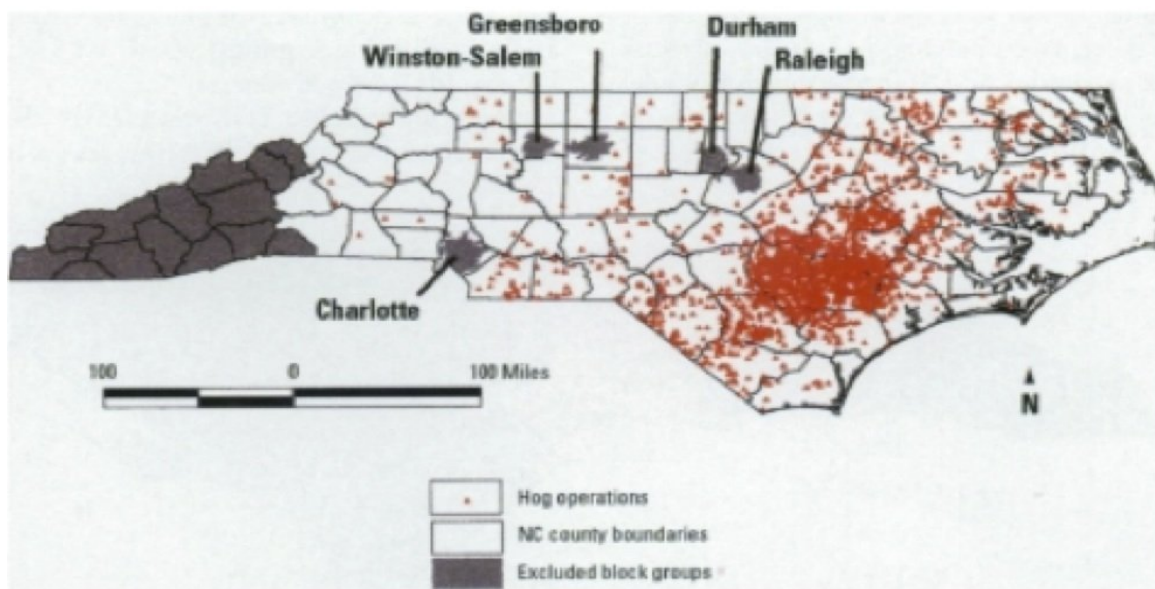
According to the 2010 census, African Americans and Latinos/as in Duplin County equal 25,631 (48.2%) or almost half the total population, and has one of the worst poverty rates in the state. Forty-five (45) percent of the population are either children or elderly. Duplin County is a thinly populated county where farming and textiles were once the primary industries but now most of the textile factories have relocated, and traditional family farms have been replaced by industrial agriculture. The above statistics indicate a distressed, invisible and disenfranchised community, with only about half the population having a high school education. To add to this distressing predicament, Duplin County ranks first in being the most medically uninsured county in the state, with the highest cancer rate as well.

Water, air and soil in eastern North Carolina are severely polluted. Over the past fifteen to twenty years, Duplin County has experienced a high rate of development of industrial animal operations and North Carolina, in particular, has moved from fifteenth to second in hog

production in the U.S. Thousands of hogs are mated and raised in large barns, where massive amounts of waste are accumulated that contaminate the environment. Liquid animal waste is pumped into lagoons to be stored, it is then sprayed on farmland to be used as crop fertilizer. Over-applying this waste eventually contaminates the soil, and the runoff gets into the creeks and streams and contaminates surface water.

Research reveals that chemicals, toxins and particulate matter from CAFOs pollute the air; other toxins associated with swine and poultry CAFOs also contaminate soil and crops. (In 2006, animal waste sprayed on spinach resulted in an outbreak of *E. coli*, affecting over 200 consumers in multiple states.) Dry litter from poultry operations is stock-piled for weeks prior to being spread onto fields and waste from the dredging of lagoons is also sprayed onto farm land. These waste disposal practices accumulate nitrogen and phosphorous in the soil in levels that lead to leaching of nitrate, nitrite, and phosphorous into local surface waters.

Everyone in Duplin County lives in close proximity to a CAFO (Confined Animal Feeding Operation) where air, water and land pollution saturate the entire community. Scientific research on air quality has shown that hog waste produces hydrogen sulfide (which can be fatal), plus ammonia and



particulate matter. Headaches, runny noses, sore throats, excessive coughing, respiratory ailments, nausea, diarrhea, dizziness, burning eyes, depression, fatigue, asthma and depression are some of the health problems reported by residents living near industrial hog operations.

In addition to the liquid waste stored in lagoons (holes in the ground where hog waste is stored), dead animals, guts and internal organs, are transported through Duplin County from processing plants and animal operations to a rendering plant where they are made into animal feed and other by-products. These transport trucks pass through residential communities many times during the course of a day, adversely affecting the health of Duplin's most vulnerable populations—children and the elderly—on a steady basis. These trucks not only contain dead hogs, they also contain dead turkeys and chickens.

In addition to Duplin's 2.2 million hogs, Duplin is also the home of 1 million turkeys, ranking it second in the nation for turkey production. North Carolina's Division of Water Quality in the Department of Environmental and Natural Resources does not collect information about these poultry operations, yet people who live near these confined poultry operations know that their health is at stake: The smell of ammonia from turkey waste causes irritation of the nose and throat, and research has shown that there are severe health effects from industrial animal production.

Past research from REACH and other sources offers opportunities for discussion among community residents and researchers on how to address potential climate change and resiliency.

### **C. Organization's Historical Connection to the Affected Community**

The Rural Empowerment Association for Community Help (REACH) was formed to address severe and devastating problems that face residents in Duplin County, North Carolina. Through building a strong coalition of citizens from all walks of life, REACH's goal is to collaborate with other agencies for assisting Duplin County residents in achieving a higher social, economic and environmental way of living and enjoying a better quality of life. The eight-member Board of Directors consists of two attorneys, a retired public school principal, a community college student support officer, a CAFO worker, an epidemiology doctoral student, a public school teacher from Central America, and a grassroots community advocate. There are an equal number of males and females; 75% are persons of color. REACH has three staff, numerous consultants, a renovated office building, used office furniture (made possible by the generosity of the local community), and many supportive constituents who attend monthly community meetings where they discuss problems that uniquely affect people of color in Duplin and surrounding counties. Board members, staff, consultants and concerned volunteers are involved in REACH's decision-making process and are dedicated to creating and building a stronger community for initiating systemic change in Duplin County.

Shortly after its founding in 2002, REACH held listening sessions in public housing, where 98% of the residents are people of color, and informational sessions at local churches to educate and empower citizens for building healthy, sustainable community and positioning themselves to take leadership and decision-making roles. These two activities were the impetus for every other project REACH has ensued. For several years, we offered an Emergency Management Assistance program in which we helped families in need of assistance with rent, mortgages or utilities. In addition, REACH has taught classes including English/Spanish, Small Business Development, Money Management and Homeownership. Our greatest contribution to the community thus far has been in the area of environmental health.

In 2004, REACH began collaboration with UNC-Chapel Hill Epidemiology researchers and students to monitor air quality and respiratory health. In 2005, REACH received an EPA Environmental Justice Small Grant to address public health problems possibly exacerbated by toxins and chemicals from hog waste disposed by way of hog lagoons and sprayfields. In 2007, REACH received an EPA Environmental Justice Collaborative Problem Solving Grant to develop a partnership for intensifying dialogue between community members and researchers and opening the way for dialogue among stakeholders on different levels of power in Duplin

County and the region. With each EPA grant, we have been able to increase community capacity to address environmental and public health concerns. The advisory committee, started with the Small Grant in 2005, has been active in regional and statewide activities, including addressing the Pew Commission on Industrial Farm Animals, attending a Clean Water Rally, participating in a CAFO (Confined Animals Feeding Operations) Conference, working closely with the NC Environmental Justice Network and attending quarterly meetings and annual summits, plus sponsoring five stakeholder conferences. The last one, held in May 2010, had more than 50 people in attendance representing the grassroots population, local elected officials, school administrators, representatives from community-based organizations and environmental groups, local businesses, researchers, and state and national government agencies. REACH continues its relationship with community residents and organizations through its DEHAP community meetings, classes and assistance provided to access community services.

#### **D. Project Description**

Industrial animal operations produce massive amounts of waste that contaminate water and air and expose surrounding residents to toxins and pollution. Waste from hog confinement buildings and lagoons, a liquid waste system, is sprayed onto fields, and the run-off from these spray fields trickles down to the creeks and streams, ultimately impairing that watershed.

Over the past ten years, REACH has worked along with various partners, including researchers, environmentalists, the grassroots community, county leaders, state and government agencies, and in some cases, representatives from the industrial animal industry, to collaborate on solutions to the waste management problem associated with industrial hog operations. Research with UNC-Chapel Hill has shown that hog waste produces hydrogen sulfide (which can be fatal), plus ammonia and particulate matter. Respiratory ailments, asthma and depression are a few of the health problems that result from living near lagoons and spray fields. Data from UNC-Chapel Hill and Johns Hopkins University shows that existing waste management systems affect air and water quality.

REACH water samplers and researchers from UNC-Chapel Hill have documented that waste from these hog operations is flowing into local watersheds. Results of surface water testing conducted in Duplin County watersheds over the past few years show that samples exceeded the federal Clean Water Act and NC Department of Environment and Natural Resources surface water quality criteria for fecal coliforms 38% of the time and exceeded the 1986 EPA water quality criteria for *E. coli* and enterococci 43% and 73% of the time, respectively. Samples have also detected presumptive MRSA (Methicillin Resistant *Staphylococcus aureus*) bacteria, which is a major public health concern.

This EJSG Project, Climate Change Resiliency: Effects of Industrial Animal Production on ME (Mother Earth), will organize and share discussions on the correlation between industrial animal operations and climate change. In his book, *This Moment on Earth*, John Kerry writes about industrial progress and its contributions to global warming. He emphasizes that chemicals emitted from these operations are contaminating the air we breathe, and, along with other methods of environmental pollution, contributing to earth changes and planetary devastation. He asserts that the poor and minorities have a greater chance of living near and getting ill from

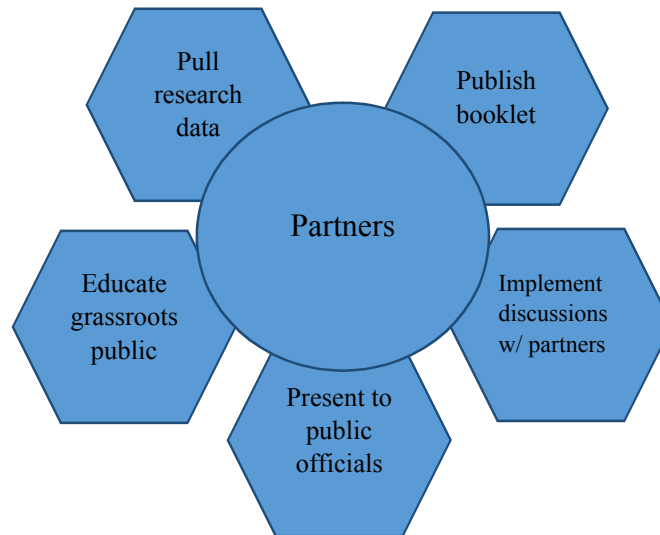
pollution, and “...far too long, local governments have encouraged polluting industries to build their plants and dumps in poorer neighborhoods. One consequence from this troubling trend is that rates of respiratory diseases, particularly asthma, are significantly higher among African American children than they are among whites.”

Additionally, Ron Cummins at [www.ecowatch.com](http://www.ecowatch.com) (January 21, 2013) supports a growing number of climate experts in their conclusions that “industrial food and farming systems are the major cause of man-made global warming.” He further states that “CAFOs play a key role in this impending disaster.”

Climate Change Resiliency: Effects of Industrial Animal Production on ME (Mother Earth) will have several elements:

1. **Pulling significant data/results** from CHEIHO, Surface Water Sampling, CAFO Workers Exposure and other significant research conducted by REACH and its partners. REACH has done vast research, in collaboration with UNC-Chapel Hill and Johns Hopkins University, on health effects from animal operations and contamination of the air, water and soil. We propose to gather results from these projects, plus other significant research on CAFOs and climate change, and put them together in one document for sharing with local and state communities, elected officials, and environmental agencies.
2. **Preparing publication (pamphlet or booklet)** that illustrates significant findings REACH research and its partners and their connection to earth changes. Summaries of the findings from this project have never been published in one place. REACH proposes to publish these results and make them available to our community, including partners, grassroots constituents, elected officials, other community-based organizations, and environmental agencies. Putting them together in one document will allow us to share the story of the relationship between industrial animal operations and climate change in a way that people can easily understand and appreciate.
3. **Sponsoring gatherings** to educate grassroots populations on the correlation between industrial animal operations and climate change. REACH will assemble members of the Duplin Environmental Health Awareness Project (DEHAP) and other members of the grassroots community to educate them on how environmental pollution is contributing to climate change and planetary devastation.
4. **Implementing discussions among partners** on the relationship of past research on industrial animal production to climate change and what we can do to prepare for resiliency. REACH partners have been essential in collaborating on environmental issues related to industrial animal operations. Together we have made major efforts in uncovering health maladies linked to individuals who live near and/or work in CAFOs. Gathering this information for discussion should shed additional, extensive light on our work thus far, climate change and the future of the planet.
5. **Making presentations to elected and other government officials** on findings from past research and connections to climate change. Government officials are aware of the work

REACH and its partners are doing. Some of our partners have been doing this work and reporting it to government agencies for over twenty years. The response has been almost nil. We usually have been given a forum to be heard but nothing more. We want to take our most current research results on the effects of industrial animal production on workers and residents who live in close proximity and share it with emphasis on climate change and resiliency.



The previous graphic illustrates the various elements/phases in this project. These phases will be conducted by REACH and its partners—Duplin Environmental Health Awareness Project (DEHAP), the Community Review Board, UNC-CH, Johns Hopkins University, Southern Environmental Law Center (SELC), and the North Carolina Environmental Justice Network (NCEJN).

**The Duplin Environmental Health Awareness Project (DEHAP)** was formed ten years ago when REACH first submitted an application for an EPA Environmental Justice Small Grant. This group is made up of grassroots constituents from Duplin, Sampson, Wayne, Bladen, and Onslow counties who have met on the second Wednesday of every month to share pertinent information on how they have been affected by living near or working in CAFOs and to hear researchers and other environmental experts speak on the relevant work they are doing to address public health and environmental injustices. Members of this group have written letters to legislators and visited their offices, rallied with other similar groups to speak out publicly about their concerns, participated by telling their stories on video documentaries, spoken to the Pew Commission on Industrial Animal Production and other similar groups, made presentations to environmental justice students, and generally made themselves available to have their voices heard on the subject of CAFOs and how it is affecting their health. This group will be the primary conduit for sharing information gathered on Climate Change Resiliency: Effects of Industrial Animal Production on ME (Mother Earth).

**The Community Review Board**, in contrast to the advisory group (DEHAP) which is comprised of grassroots leaders, has a more holistic configuration. It is made up of medical personnel, community leaders, CAFO workers, organizers, partners and DEHAP representatives. The Community Review Board takes responsibility for pursuing solutions to public health concerns from industrial agriculture, collaboration with local and state government, and reviewing and approving tentative research projects. This group will assist with planning and arranging for dissemination of information from Climate Change Resiliency: Effects of Industrial Animal Production on ME (Mother Earth).

**UNC-Chapel Hill University School of Public Health** has been a REACH partner since the beginning of our environmental justice work. We have participated with them in Community-based Participatory Research (CBPR) on various projects, including Community Health Effects from Industrial Hog Operations (CHEIHO), Rural Air Pollution and Children's Health (RAPCH), Duplin Environmental Health Awareness Project (DEHAP), Environmental Justice CPS (Collaborative Problem Solving), Maple Creek Watershed Awareness and Compliance, and Hazardous Substances and Arsenic in Surface Waters in Eastern North Carolina, plus other projects. UNC representatives meet regularly with REACH staff to discuss the current environmental climate in Duplin, the nation and the world. UNC-Chapel Hill will be a primary partner in all phases of this project, particularly pulling together climate change information from research findings and implementing discussions among partners on and the relationship of past research on earth changes.

**Johns Hopkins University School of Public Health** began partnering with REACH and UNC-Chapel Hill in recent years to study the effects of industrial animal operations on workers and their families. Extensive data has been gathered from this research and is in the process of being published. Collaboration continues through a recent application for funding for an air pollution monitoring project. REACH staff have spoken to classes at the university and researchers regularly talk with and visit REACH and DEHAP meetings. Johns Hopkins will be instrumental in participating in partner discussions and in making presentations to government officials.

**The Southern Environmental Law Center (SELC)** has been a partner with REACH for several years now and recently filed a Title VI Law Suit against Duplin County and the NC Department of Environment and Natural Resources contending that the aforementioned agencies have jeopardized the health of Duplin County residents. Similarly, six hundred (600) residents have filed nuisance law suits against the industrial hog industry specifying that odors and spraying from nearby farms have adversely affected the quality of their lives and their well-being. SELC will be a major contributor to partner discussions.

**North Carolina Environmental Justice Network (NCEJN)** has a mission "to promote health and environmental equality for all people of North Carolina through community action for clean industry, safe work places and fair access to all human and natural resources." They have been a partner with REACH since the beginning of our environmental justice work, when their Executive Director approached REACH about community organizing to address public health concerns regarding CAFOs in Duplin County. This relationship has continued for many years and will continue through Climate Change Resiliency: Effects of Industrial Animal Production

on ME (Mother Earth). NCEJN will be a major contributor to partner discussions and presentations to government agencies.

## **E. Organizational Capacity and Programmatic Capability**

Efficiency in fiscal management has been a pre-requisite and priority for ensuring effective program implementation and ultimate success of REACH projects.

In the early years, REACH managed emergency assistance funds from the Emergency Food and Shelter Program (EFSP) National Board. Evidence of accountability included: Strict adherence to EFSP guidelines and procedures; Careful, detailed screening of applicants; Maintaining comprehensive, adequate records, including bills, signed receipts, signed applications and questionnaires; Case by case documented details of action steps taken with each request; Detailed, written, comprehensive reports to local reporting board and EFSP National Board; Full compliance recognized by EFSP National Board; and Clear, explicit reports to REACH Board. Reports are always submitted in a timely manner.

In 2008, REACH contracted with United Food and Commercial Workers to implement a community organizing project that required hiring eight contractual workers who engaged over 1,300 households in three counties—Duplin, Sampson and Bladen—for gathering information concerning environmental pollution in their communities and sharing helpful data on environmental risks. Fiscal management included extensive recordkeeping, based on weekly time sheets, mileage, gas expense accounts, weekly household contact logs, weekly follow-up logs, monthly status reports, monthly financial reports and a final report.

In 2012, REACH contracted with epidemiologists from Johns Hopkins to test CAFO workers. Organizers were hired to recruit and conduct nasal swabs on CAFO workers and their families, testing for multi-drug resistant bacteria and influenza. Fiscal management included utilizing Quickbooks bookkeeping software for tracking cash flow and generating financial reports; maintaining accurate banking records; compilation of invoices and purchase authorizations; detailed minutes of each neighborhood/community meeting; regular reports to Johns Hopkins staff; plus constant communication for relationship building among all partners.

System management of EPA grants over the past five years, the Maple Creek Watershed Awareness and Compliance Assistance and the Hazardous Substances and Arsenic in Surface Waters in Eastern North Carolina, has been handled in much the same way with particular attention paid to EPA reporting guidelines.

## **F. Qualifications of the Principal Investigator or Project Manager (PI/PM)**

**Dr. Christopher Heaney** brings a strong background in public health microbiology, epidemiology, and community-based participatory research (CBPR) to this research. As a W.K. Kellogg Health Scholar-Community Track at UNC Chapel Hill, he developed strong partnerships with community-based organizations to study the health impacts of zoonotic pathogen exposures in workplace and community settings related to industrial food animal production. Dr. Heaney has received 6 CBPR pilot awards, 4 with partners at the Rural

Empowerment Association for Community Help (REACH) and the NC Environmental Justice Network (NCEJN) to investigate methicillin- (MRSA) and multidrug-resistant *S. aureus* (MDRSA) exposures in livestock workers and household members at industrial and antibiotic-free livestock farms in NC. With these partners, he has completed the first study in the United States comparing MRSA and MDRSA exposure risks in industrial versus antibiotic-free livestock workers and their adult ( $\geq 18$  yr) and child (7-17 yr) household members. This pilot work forms a solid basis for the proposed research of MRSA and MDRSA exposure in infants and young children under 7 in rural eastern NC. Dr. Heaney has a strong interest in integrating methodological issues in microbiologic, epidemiologic, and community-based participatory sciences, particularly through studies that incorporate non-invasive biomarkers of pathogen exposure. He has estimated exposure-response associations in studies of zoonotic pathogens and has applied empirical and biologically-based models to improve understanding of time-related factors, such as latency and time since exposure in the context of occupational and community sources of pathogens and other contaminants. As Assistant Professor of Environmental Health Science (primary) and Epidemiology (joint) at the Johns Hopkins Bloomberg School of Public Health and as a fixed-term faculty member at UNC Chapel Hill's Environmental Sciences and Engineering Department, he contributes actively to research projects on the epidemiology of MRSA and MDRSA with other faculty, teaches methods of occupational and environmental epidemiologic data analysis, and advises masters and doctoral students in this area.

**Devon Hall** is the Co-P.I and Program Manager for this project and has been through each of our previous studies. He has a keen awareness and understanding of scientific research and a special kinship with university researchers and has brilliantly collaborated with partners and EPA officers in developing projects for addressing environmental injustices in eastern North Carolina. Mr. Hall is a lifetime resident of the Duplin County and so is knowledgeable about the community, the people, the politics, and environment. He was the Duplin Community Coordinator for the CHER (Community Health Effects Research) and CHEIHO (Community Health Effects of Industrial Hog Operations) projects conducted through UNC-Chapel Hill. In 2005, REACH was awarded an EPA Environmental Justice Small Grant, and in 2007, a Collaborative Problem Solving Grant to address public health concerns related to waste disposal from industrial hog operations for which he was the Principal Investigator. He knows the extreme impact that industrial animal operations (CAFOs) have on the environment, and understands the geography and topography of Duplin County and the placement of many confined animal feeding operations (CAFOs). In the past few years, he has worked closely with scientists in testing water samples, assessing health effects of CAFO workers, and related research. He is also a licensed electrician and has helped engineers with setting up and monitoring research equipment for testing air quality, when necessary. Another plus is that Devon works very closely with small family farmers and is aware of the need to preserve the land for growing healthy crops.

## **G. Past Performance in Reporting on Outputs and Outcomes**

In 2011, REACH submitted an application for Compliance Assistance funding of \$14,988 for the project, Maple Creek Watershed Awareness and Compliance Assistance, which was implemented early in 2012 over a four-month period. The agreement # was EQ95477411 and

points of contact were Elvie Barlow and Denise Tennessee. Results of water sample testing conducted in Duplin County watersheds over the past few years showed that samples exceeded the Federal Clean Water Act and NC Department of Environment and Natural Resources surface water quality criteria for fecal coliforms (200 CFU/100mL) 38% of the time and exceeded the 1986 federal EPA water quality criteria for *E. coli* (126 CFU/100mL) and Enterococci (33 CFU/100mL) 43% and 73% of the time, respectively. Water samples were positive for swine-specific Bacteroidales Pig-1-Bac (17%), Pig-2-Bac (13%), and Pig-Bac-2 (65%). Bacteroidales Pig-1-Bac and Pig-2-Bac had specificities of 100% while Pig-Bac-2 had a specificity of 40%. The sensitivities of these markers ranged from 70-90%.

Subsequently, in 2011, REACH submitted an application for an EPA EJ Small Grant for \$50,000 for the project entitled Hazardous Substances and Arsenic in Surface Waters in Eastern North Carolina that was also implemented in 2012. Points of Contact were Elvie Barlow and Denise Tennessee, and the Agreement Number was EQ95486812. Reports were submitted via email on a regular basis. A final report was submitted within three months of the end of the project, after a request for extension. This report gave a thorough description of the project, how it was implemented, who was involved, and the progress that was made in achieving expected outputs and outcomes. Research data analysis and results indicated that very little arsenic was detected in surface water and animal waste, which was used as a baseline for measurement; inorganic arsenic and its metabolites were below the water quality criteria for arsenic in surface water; there was extremely high evidence of *E. coli* (average *E. coli* concentration of  $323 \pm 356$  CFU/100ml), and some evidence of multi-drug resistant staph aureus. This collaborative effort with researchers at UNC-Chapel Hill resulted in REACH and researchers working closely together to plan, coordinate and implement the project; making regular presentations together to the community on the progress of this project; and collaborating further with UNC-CH and John Hopkins University to recruit and swab CAFO workers and their families for multi-drug resistant bacteria and influenza. More extensive research is being planned; researchers, REACH, the affected community, and other concerned agencies are working together to determine where further collaboration is needed and next steps.

#### **H. Quality Assurance Project Plan (QAPP) Information (1 to 2 sentences)**

This project will involve the use of existing data much of which was gathered in conjunction with UNC-Chapel Hill researchers, and so, a QAPP for this project will be developed in collaboration with researchers at the UNC School of Public Health.